WHAT IS CLAIMED IS:

1. An in-building CATV system connected to a lead-in wire from an external bi-directional CATV system for transmitting a downward signal inputted from said lead-in wire to plural in-building terminals via in-building transmission lines, transmitting an in-building upward signal inputted to said terminals via an up-converter for frequency-converting an upward signal outputted from a terminal device, with a frequency lower than that of said downward signal to an in-building upward signal with a frequency higher than that of said downward signal, and frequency-convert said in-building upward signal to an upward signal with an original frequency outputted from said terminal device by a down-converter provided between said transmission line and said lead-in wire to transmit said upward signal to said lead-in wire, wherein the in-building CATV system comprises:

a reference signal generating means for generating a reference signal with a constant frequency different from that of any of various transmission signals flowing upward and downward in said transmission line, and

a reference signal transmission means for transmitting said reference signal generated by said

reference signal generating means to said transmission line, and

said up-converter at the terminal side and said down-converter at said lead-in wire side can frequency-convert said upward signal and said in-building upward signal, respectively using said reference signal with the constant frequency.

2. An in-building CATV system according to claim 1, wherein

said reference signal generating means and said reference signal transmission means are provided in said down-converter.

3. An in-building CATV system according to claim 1, wherein

the frequency of the reference signal transmitted to said transmission line by said reference signal transmission means is set to a frequency which is within a range of a frequency band set as a transmission frequency band of said downward signal in the in-building CATV system and does not overlap with said downward signal.

4. An in-building CATV system according to claim 1, wherein

the frequency of the reference signal transmitted to said transmission line by said reference signal transmission means is set to a frequency lower than that

of any of various transmission signals flowing upward and downward through said transmission line.

5. An in-building CATV system according to claim 4, wherein

the frequency of the reference signal transmitted to said transmission line by said reference signal transmission means is set to a value within a range from 5 MHz to 26 MHz, lower than a frequency band set as a transmission frequency band for said downward signal in the in-building CATV system.

6. An in-building CATV system according to claim 1, wherein

an upward signal with a low frequency which has not been frequency-converted by said up-converter can be directly transmitted to said lead-in wire.

7. An in-building CATV system according to claim 1, wherein

a reception antenna is provided on said building and a reception signal from said reception antenna can be transmitted to said plural terminals via said transmission line together with said downward signal.

8. A down-converter in the in-building CATV system according to claim 1 provided between said lead-in wire and said transmission line, comprising;

a first downward signal path for transmitting a

downward signal inputted from an external bi-directional CATV system via said lead-in wire to said transmission line,

a first reference signal extracting means for extracting said reference signal with a constant frequency among upward transmission signals inputted via said transmission line, and

a first frequency conversion means for taking out said in-building upward signal among upward transmission signals inputted via said transmission line, for frequency-converting said in-building upward signal to the original upward signal outputted from said terminal device using the reference signal extracted by said reference signal extracting means and for transmitting said frequency-converted upward signal to said lead-in wire.

9. A down-converter according to claim 8 provided with a first determining means for determining whether a reference signal is extracted by said first reference signal extracting means or not, and

a first specific transmission signal extracting means for extracting a specific transmission signal with a fixed frequency among downward signals flowing through said first downward signal path and for outputting said specific transmission signal to said first frequency

conversion means as said reference signal.

10. A down-converter provided between said lead-in wire and said transmission line in the in-building CATV system according to claim 2, wherein there are provided

a first downward signal path for transmitting the downward signal inputted from an external bi-directional CATV system via said lead-in wire,

a reference signal generating means for generating the reference signal with a constant frequency different from that of either of an upward and downward signals flowing through said transmission line,

a first frequency conversion means for taking out said in-building upward signal among upward transmission signals inputted via said transmission line, for frequency-converting said in-building upward signal to the original upward signal outputted from said terminal device using the reference signal generated by said reference signal generating means and for transmitting said frequency-converted upward signal to said lead-in wire and

a reference signal transmission means for transmitting the reference signal generated by said reference signal generating means to said transmission line.

11. A down-converter according to claim 10,

wherein

the frequency of the reference signal transmitted to said transmission line by said reference signal transmission means is set to a frequency which is within a frequency band set as a transmission frequency band for said downward signal in the in-building CATV system provided with said down-converter and which does not overlap said downward signal.

12. A down converter according to claim 10, wherein

the frequency of the reference signal transmitted to said transmission line by said reference signal transmission means is set to a frequency lower than that of any of various transmission signals flowing upward and downward through said transmission line.

13. A down-converter according to claim 12, wherein

the frequency of the reference signal transmitted to said transmission line by said reference signal transmission means is set to a frequency within a range from 5 MHz to 26 MHz which is lower than a frequency band set as a transmission frequency band for said downward signal in the in-building CATV system provided with said down-converter.

14. A down-converter according to claim 10,

wherein

said reference signal transmission means generates the reference signal for transmission by frequency-dividing or multiplying a reference signal generated by said reference signal generating means and transmits said reference signal to said transmission line.

15. A down-converter according to claim 10, wherein

said reference signal transmission means generates the reference signal for transmission by frequency-dividing or multiplying a high frequency signal for frequency conversion generated by said first frequency conversion means based on the reference signal generated by said reference signal generating means and transmits said reference signal to said transmission line.

16. A down-converter according to claim 8 provided with

a first upward signal path for transmitting the low frequency upward signal which is not frequency-converted by said up-converter among upward transmission signals inputted via said transmission line.

17. A down-converter according to claim 8 provided with

a downward signal amplification means in said first downward signal path for amplifying said downward

signal passed through said first downward signal path and

an upward signal amplification means in an in-building upward signal input path to said first frequency conversion means or an upward signal output path from said first frequency conversion means for amplifying said in-building upward signal or said upward signal passed through said path.

18. A down-converter according to claim 8 provided with

a reception signal input terminal for inputting a reception signal from a reception antenna equipped on a building provided with said down-converter and

a reception signal path for sending the reception signal inputted to said reception signal input terminal to said transmission line together with said downward signal.

19. An up-converter provided between said terminal and said terminal device in the in-building CATV system according to claim 1 provided with

a second downward signal path for sending the downward signal transmitted to said terminal via said transmission line to said terminal device,

a second reference signal extracting means for extracting said reference signal with a constant frequency among downward transmission signals transmitted to said

terminal via said transmission line and

a second frequency conversion means for frequency-converting the upward signal outputted from said terminal device to said in-building upward signal using the reference signal extracted by said second reference signal extracting means and for transmitting said frequency-converted in-building upward signal to said transmission line via said terminal.

20. An up-converter according to claim 19 provided with

a second determining means for determining whether the reference signal is extracted by said second reference signal extracting means or not and

a second specific transmission signal extracting means for extracting a specific transmission signal with a fixed frequency among downward signals flowing through said second downward signal path and for outputting said specific transmission signal to said second frequency conversion means as said reference signal, when it is determined by said second determining means that said reference signal is not extracted.

21. An up-converter according to claim 19, wherein there is provided a reference signal restoration means for restoring the reference signal corresponding to the reference signal used for frequency-converting the in-

building upward signal to the upward signal by said down-converter by frequency-dividing or multiplying the reference signal extracted by said second reference signal extracting means, and said second frequency conversion means frequency-converts said upward signal to said in-building upward signal using the reference signal restored by said reference signal restoration means.

22. An amplifier provided on the transmission line from said down-converter to said terminal in the in-building CATV system according to claim 1 provided with

a third downward signal path for sending the downward signal transmitted from said down-converter via said transmission line to the terminal side,

a downward signal amplification means provided on said third downward signal path for amplifying said downward signal,

an in-building upward signal path for sending the in-building upward signal transmitted from said terminal side via said transmission line to said down-converter,

an in-building upward signal amplification means provided on said in-building upward signal path for amplifying said in-building upward signal, and

a first reference signal path for connecting the transmission line of said down-converter and the transmission line of said terminal side so that said

reference signal can be passed through said first reference signal path.

23. An amplifier according to claim 22 provided with a second upward signal path for connecting the transmission line of said down-converter and the transmission line of said terminal side so that the low frequency upward signal which is not frequency-converted by said down-converter can be passed through said second upward signal path.

24. An amplifier according to claim 22 provided with

one or plural branch terminals,

a downward signal branching means for branching a part of the downward signal amplified by said downward signal amplification means and for outputting the branched downward signal from said branch terminals,

an in-building upward signal input means for transmitting the in-building upward signal inputted to said branch terminal to said in-building upward signal path at the input side of said in-building upward signal amplification means, and

a second reference signal path for connecting said branch terminal and said first reference signal path so that said reference signal can be passed through said second reference signal path.